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## Management of black scurf disease of potato in Rajasthan

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### Abstract

Black scurf (*Rhizoctonia solani*) diseases of potato are becoming prominent in many potatoes growing state resulting in economic losses, since a decade. An experiment was conducted to find out more effective management approaches through chemicals, taking cv. Kufri Bahar with five treatments involving chemicals i. e. Pencycuron (Moncern) and Boric acid, application before storage alone. Minimum disease incidence (17.25) and tuber yield (26.11 t/ha) was noticed in Tuber spray treatment with Pencycuron 22.9% (Moncern) @ 0.50 before planting alone followed by Tuber dip treatment with 3% boric acid or 10 min. before planting. These treatments can provide an effective management of potato tuber diseases

**Keywords:** Black scurf, management, potato, *Rhizoctonia solani*, Pencycuron, boric acid

### Introduction

Potato (*Solanum tuberosum* L.) is an annual, herbaceous, dicotyledonous plant of family Solanaceae. Potato is commonly known as disease oriented problematic crop throughout the world. The management of *R. solani* is difficult due to its soil-borne nature. The fungus is present in most of the soils [2]. Once it becomes established in a field, it remains viable there indefinitely [4]. Dry sclerotia of the pathogen are reported to survive up to six years when stored at room temperature [7]. Soil-borne inoculum of *R. solani* is the main cause of black scurf on potato tubers and also contributes to eyes germination inhibition, sprouts killing, stem, stolon and root damage [9, 10]. Pioneer studies on the prevalence, incidence, severity and biology of black scurf disease pathogen in Pakistan have been reported by [11]. The disease was found prevalent in all the eight potato production agro-ecological zones. Although, the diseases do not affect the yield quantitatively but deteriorate the quality and acceptability of tubers for seed adversely affecting the market price of the table potatoes. Tuber spray treatment with Pencycuron 22.9% (Moncern) @ 0.50 before planting and tuber dip treatment with 3 per cent boric acid has been identified as a safe chemical which can replace hazardous organomercurials for controlling black scurf (*Rhizoctonia solani*), common scab (*Streptomyces scabies*), dry rots (*Fusarium* spp.) and soft rots (*Erwinia* spp.) of potato (Arora RK., 2005). Fungicide Pencycuron is known to exhibit high and specific activity against *Rhizoctonia solani* and have been reported to very effective for control of black scurf [17, 8, 16]. Boric acid and pencycuron are the two chemicals which are frequently used by Indian farmers to control black scurf. In the present study efforts have been made to manage these diseases with chemicals i.e. Pencycuron 22.9% (Moncern) @ 0.50 before planting alone followed by Tuber dip treatment with 3% boric acid or 10 min. before planting. These treatments can provide an effective management of potato tuber diseases.

### Experimental

#### Materials and methods

A field experiment was conducted at ARS Kota (Agricultural University, Kota (Rajasthan), during 2 consecutive winter (rabi) season of 2013-14 to 2014-15 and find out the effective management of black scurf disease of potato. Five treatments were evaluated for this experiment (Table 1). The experiment was conducted using black scurf infested seed potatoes (40-60 gm) of cv. Kufri Bahar having 100 per cent disease incidence (I), with average disease index (DI) 1.0-2.0.

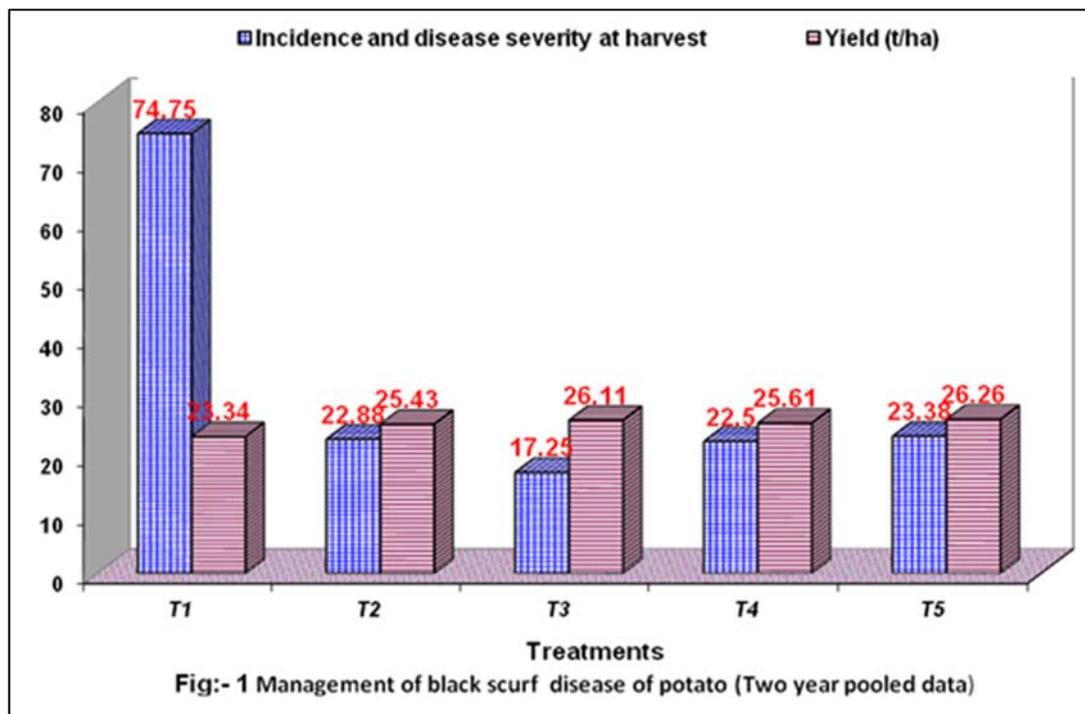
In the treatments T<sub>3</sub> and T<sub>5</sub>, application of Pencycuron 22.9% (Moncern) and 3% Boric acid as a spray, the formulations were sprinkled evenly over the seed tubers whose surface was made wet with water and tubers rolled to cover them with the chemical evenly. The treatments were applied immediately before planting of the seed tubers in field. Other treatments T<sub>2</sub> and T<sub>4</sub>, tuber dip treatment with Pencycuron 22.9% (Moncern) @ 0.25% for 10 min. before planting and Tuber dip treatment with 3% boric acid or 10 min. before planting respectively. Planting was done in the afternoon hrs in the third week of November in both the years. The seed tubers after the treatments were planted at 60 x 20 cm spacing in 3 x 2 m plots (5 rows with 10 tubers each). Each treatment was replicated four times in a randomized block design. All other recommended practices required for cultivation of the crop were followed. The crop was harvested 100 days after planting (DAP). After washing the tubers, black scurf disease incidence and intensity were recorded separately. Disease incidence and index were recorded after harvest on 100 tubers selected at random from each replication. Observations on per cent disease incidence were recorded as per the formula given by [12]. Disease was measured on a scale of 0-5 and Disease index (DI) was calculated by using formula described by [6].

## Results and Discussion

All the treatments significantly checked black scurf incidence and index over untreated control during both the years (Table 1 and Fig-1). Minimum disease incidence (17.25) and tuber yield (26.11 t/ha) was recorded in the treatment (T<sub>3</sub>) tuber spray treatment with Pencycuron 22.9% (Moncern) @ 0.50 before planting alone followed by Tuber dip treatment with 3% boric acid or 10 min (T<sub>4</sub>). The maximum diseases incidence of black scurf (74.75%) with minimum yield (23.34 t/ha) were recorded in treatment T<sub>1</sub> Untreated diseases tuber (Control). The results confirmed these finding earlier reported by [3, 13, 14]. The results obtained in the present study are more encouraging with respect to the management of the economically important disease. Chemical pencycuron @ 0.057% a.i. or boric acid (3%) used as spray and tuber treatment prior to planting found significantly effective to reduced disease incidence of black scurf [2]. Earlier workers have reported the use of pencycuron as dip treatment at a much higher rate of 0.11% and 0.17% a.i. for the seed treatment [16]. Boric acid in our studies has shown good control of black scurf at 3 per cent concentration while earlier workers [15] have also shown its activity at 3 per cent. To conclude we can say that the Pencycuron 22.9% (Moncern) @ 0.50 and 3% boric acid have potential to manage of black scurf disease of potato and are non-hazardous.

**Table 1:** Management of black scurf disease of potato (Two year pooled data)

Treatments	Incidence and disease severity at harvest	Yield (t/ha)
T1- Untreated disease tubers (control)	74.75	23.34
T2 -Tuber dip treatment with Pencycuron 22.9% (Moncern)@ 0.25% for 10 min. before planting	22.88	25.43
T3-Tuber spray treatment with Pencycuron 22.9% (Moncern) @ 0.50 before planting	17.25	26.11
T4-Tuber dip treatment with 3% boric acid or 10 min. before planting	22.50	25.61
T5 -Tuber spray treatment with 3% boric acid before planting	23.38	26.26
CD at 5%	3.52	1.06
Sem ±	1.20	0.36
CV (%)	10.60	4.05



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